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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,107	09/12/2003	David H. Hwang	42P16017	9100

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EXAMINER

GABOR, OTILIA

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 04/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/662,107	Applicant(s) HWANG, DAVID H.	
	Examiner Otilia Gabor	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the title includes a spelling error "diffraction" should be --diffraction--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 5, 7, 9, 12, 13, 21-25, 27 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Purvis, Jr. et al. (U. S. Patent 5,540,494).

Purvis discloses a system and method for determining critical characteristics, such as the size, of a feature, the system comprising: a stage (manifold) to hold the subject structure (sample) that includes a feature (particle) with a size (radius) to be measured; a radiation source (laser) to emit radiation directed at the feature; a detector (photodiode, PMT) to detect a diffraction pattern caused by the radiation interacting with the feature and to generate a signal representative of at least in part of the diffraction pattern; and a computer coupled to the detector to receive the signal and to compare a feature size identifier of the diffraction pattern with a library of feature size identifiers, each feature size identifier in the library being associated with a known feature size

(see Figs.1, 2, 3, 5, 7, 25-28, Col.4, line 60-Col.7, line 65, Col.45, line55-Col.47, line 20). In operation, the subject having a feature (particle) is irradiated with light from the laser light source to form a diffraction pattern; the diffraction pattern is detected using a detector; and the particle size (radius) is determined based on a comparison between the measured size (which is done through measuring the diffraction pattern intensity) and the reference sizes saved in the library of the computer (see Figs.25-28).

Regarding claims 5, 7 Purvis discloses that his method works when the light is reflected and/or transmitted by the sample and thus the detection is inherently positioned on the same and/or opposite side from the feature depending on what type of measurement (reflected or transmitted) is being done.

Regarding claims 9, 23, 24, 25 Purvis discloses that the feature size identifier is an envelope plot whereby the positions of the diffraction minimas and maximas are plotted and detected using the detector (see Figs.2).

Regarding claim 13 Purvis discloses that the radiation source is a laser (see Fig.1).

Regarding claim 27 Purvis discloses that the feature size (particle radius) is calculated.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6, 8, 11, 17, 18, 19, 20, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purvis and further in view of Littau et al. (U. S. Patent 6,429,930).

Purvis discloses a general method of determining the size of a feature using its diffraction pattern, however it fails to disclose that the feature comprises a transmissive window defined by a radiation-opaque microelectronic structure mask substrate and that there is a vacuum enclosure surrounding the source, the stage and the detector.

However, these features are inherently present in a system where the feature, the size of which is to be determined, is a microelectronic structure. This is clearly shown by Littau, which discloses a system and method for determining the characteristics of a microelectronic structure using the diffraction signature difference analysis. Since the diffraction signature analysis method is applicable to many different features, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the Purvis method on the feature of Littau, and therefore, using the Purvis method on a feature that has a window defined by a radiation-opaque microelectronic structure mask substrate where the source, detector and the stage are enclosed in vacuum. Regarding claim 26 Littau discloses a feature that has a known pitch. Regarding claims 11, 17, 19 Littau discloses that high -energy beam and/or X-rays can be used as radiation sources besides the disclosed laser source.

6. Claims 2, 3, 4, 10, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Purvis.

Purvis fails to disclose that the laser source is a helium-neon source emitting

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radiation having a wavelength of about 633 nanometers and that the detector is a charge-coupled-device, however since he does not put a limitation as to the type of laser sources and detectors that can be used, and since he discloses using a radiation of wavelength 618 nanometers, it would have been obvious to use the claimed light source and detector, since CCD's and helium-neon lasers are well known and conventionally used in this field, and thus it would have been obvious to one having ordinary skill in the art to substitute one for the other. Regarding claim 2 Purvis fails to disclose using a radiation with a wavelength that is longer than the feature size, however, since he discloses that the type of radiation is not limited but can be chosen according to its suitability for the intended measurement, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a radiation with a wavelength that is longer than the feature size since it has been held that choosing the right value of an effective variable involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Takemura et al. (5,374,989); Giglio (4,755,052); Cantrall et al. (5,530,551).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Otilia Gabor whose telephone number is 571-272-2435.

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The examiner can normally be reached on Monday, Thursday-Friday between 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Otilia Gabor
Examiner
Art Unit 2878

A handwritten signature in cursive script, appearing to read "Otilia Gabor", written in black ink.